Comprehensive Report

Meero Labs Award-to-Reward program

October 2024- March 2025

MSC
MicroSave Consulting

meero
LABS

Women in precision farming: Background and objectives

Empowering women farmers in Betul, Madhya Pradesh through precision agriculture

About the ATR program

The Award-to-Reward (ATR) Program was implemented in remote tribal villages of Betul, Madhya Pradesh, to promote the adoption of precision agriculture tools by women smallholder farmers. The program was managed by the **Women Entrepreneurship Platform (WEP)**, with **Meero Labs** as the anchor, **SIRDI** leading community mobilization, and **MSC** as the research partner.

Why it matters:

Despite women's central role in agriculture, women farmers often lack access to technology, data and training to make informed agriculture decisions. Precision agriculture tools, when delivered inclusively can increase women's productivity and enhance income and agency in farming

Core objectives:

1. **Promote awareness and adoption of precision agriculture tools among women farmers**
2. **Understand usage patterns and barriers to technology adoption and how women's behaviors and experiences of using precision agriculture tools are evolving**
3. **Support informed, climate-smart decisions on irrigation, inputs and markets while generating evidence to scale gender-intentional practices**

SIRDI- Satpura Integrated Rural Development Institution, Betul
MSC- Micro Save Consulting

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Profile of women farmers (1/2)

Women aged 31-50 constitute the backbone of the agricultural workforce, with 46% in the 31-40 group and 38% in the 41-50 group

Occupation

- Agriculture is the primary household occupation.
- **83%** of women farmers supplement their income through daily wage labour and dairy farming.
- **17%** of women farmers are also engaged in business, primarily in tailoring, food processing and poultry.

Education

70.4% of women farmers have completed primary education, but only **28.6%** reach secondary school, and less than **1%** pursue higher studies.

Household members

Women farmers typically belong to families of at least 4 members, with 2 earning members contributing to household income.

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Profile of women farmers (2/2)

Despite women's vital contribution to agriculture, women farmers have limited access to land, technology, and learni opportunities.

Phone type and ownership

- Household phone ownership patterns reveal **gendered access**. Men held primary control, younger members secondary, and women the least.
- Internet awareness and usage are concentrated among the younger generation using WhatsApp, Facebook, and YouTube.

Type of phone	Male-owned (%)	Female-owned (%)
Basic phone	63.60	36.40
Feature phone	60.00	40.00
Smart phone	84.10	15.90

Land size and ownership

- The land is passed down generationally to male descendants, with women gaining ownership only after the passing of their husbands.
- **69%** of women farmers' households own small landholdings of **2-4 acres**, highlighting their reliance on limited resources.
- Only **18%** own **5-acre** landholdings and ownership of land larger than 5 acres is rare.

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Women farmers have zero access, knowledge and awareness of precision tools

Awareness

- Lack of understanding of how ag-tech works, precautions needed and expected outcomes.
- Lack of digital literacy and decision-making powers with heavy dependence on male members.

Accessibility

- Women do not know where to purchase tools and have limited access to distribution channels.
- Training opportunities are scarce and attending them often requires male approval.

Affordability

- Women assume technology is expensive and are unaware of potential government subsidies or financial assistance.
- Financial decision-making is male-dominated, reducing women's ability to invest in technology.

> We barely get time between housework and the fields, and even learning to use a phone is hard. If that's the case, how can we manage these complex technologies?
> – A woman farmer shared in FGD

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Award-to-Reward program: Women-led precision farming solutions

A community-driven program by SIRDI, Meero Labs, MSC and WEP towards climate smart practices through accessible tools and trusted support systems to tackle water scarcity, climate and soil challenges and market pressures.

Targeted interventions to tackle on-ground challenges of women farmers in cohort villages

01

Moisture Sensors

Support real-time, data-based irrigation in water-scarce areas, helping farmers irrigate only when needed, saving time and water.

02

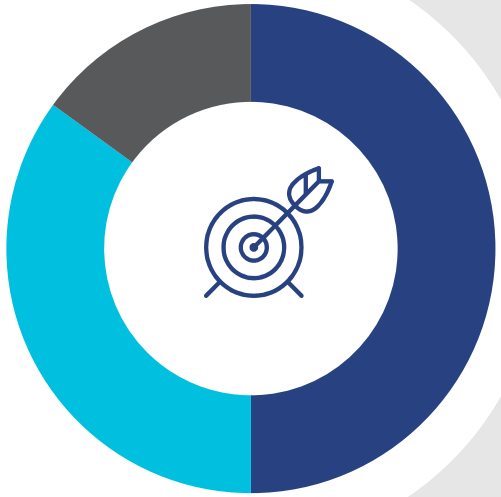
Community Soil Testing Lab

Operated by trained local women, the lab offers free testing and delivers results within 48 hours through the Meero LINK app for informed nutrient and input planning.

03

meerolink App

A centralized platform offering weather updates, market prices, soil data, and expert advisory- empowering women to make informed farming decisions.



01 Optimizing water use and reducing dependency on unpredictable rainfall and groundwater.

02 Enhancing women's participation and leadership in digital and climate-smart farming practices.

03 Creating an integrated data ecosystem that supports informed planning, monitoring, and collective problem-solving.

*ATR programs are sector-specific capacity-building programs run by the Women Entrepreneurship Platform of NITI Aayog.

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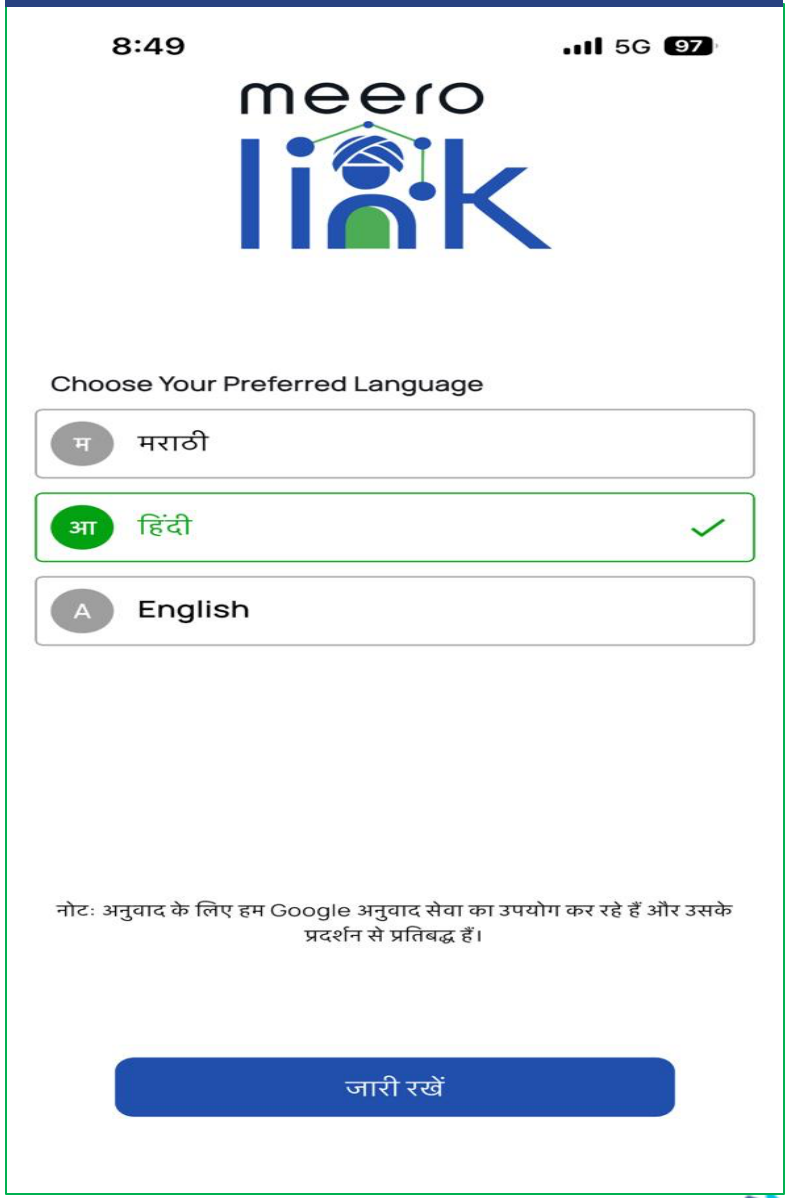
Moisture sensor

Soil testing lab

Meero Link App



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Training and capacity-building of 500 women farmers across 15 villages in Betul district through hands-on, blended learning on use of precision agriculture tools to adopt climate-smart practices

Core learning themes

Climate-smart agriculture	Soil-health management	Digital literacy	Agriculture-technology usage	App navigation

01 Participatory, small-group trainings with hands-on practice on sensors, soil testing kits, and app features.

02 Weekly training sessions for frontline workers to enhance facilitation, outreach, and follow-up support.

03 Peer learning and practical demonstrations through blended (phygital) pathways.

04 Award-based recognition from local leaders to motivate and sustain engagement.

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Community-based adoption approach

Mobilized trusted intermediaries- VC Sakhis, SIRDI Karyakartas, and local social workers- to provide **personalised, door-to-door support** for adopting precision tools.

Conducted group sessions and one-on-one guidance, supporting women farmers to **translate training into practice** suited to their local soil and water conditions.

Fostered **peer-to-peer learning networks**, where women collectively solved challenges, shared experiences, and encouraged new adopters.

Built confidence, visibility, and leadership among women farmers as local 'climate champions' and mentors within their communities.

"Discussions in groups gave me the confidence to take time and use the app and get familiar with accessing crop-related information."

- Women farmers during group discussions

Emergence of women collectives as local knowledge hubs

Women recognised as knowledge holders and trusted advisors

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“With the help of the moisture sensor, I protect my topsoil, rich in humus and nutrients, from eroding due to over-watering. This helps my crops grow stronger and healthier.”

— A moisture-sensor user and a woman farmer

Program impact

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Impact of precision tools – productivity gains for women farmers

Real-time data, better planning, and resource efficiency enabled by simple, accessible tools

Precision tools and their impact

Moisture sensor

- Reduced irrigation time by 80%.
- Saved up to 8 lakh litres of water per acre per season per moisture sensor.
- Women farmers save up to ₹1,300 in electricity costs per household.
- Farm productivity has increased 10%-30%.

Soil lab

- Reports delivered within 48 hours, replacing 6–12-month delays. (Almost 99 % faster)
- Over 200 women farmers used the community-run soil lab, contributing ₹250 each to cover technician costs.
- Run by trained local women, increasing accessibility and trust.

Meero LINK app

- Over 500 women farmers were onboarded onto the app, despite 80% relying on shared household smartphones.
- More than 50 women actively participated in expert- and peer-based agri-advisory through the platform.

> Earlier, I needed 4–5 hours of irrigation daily over 15–20 days to cover our 5-acre farm. Now, with the help of a moisture sensor, I irrigate for a maximum of 2 hours a day and can cover the entire land in just 10 days.
>
> – **A woman farmer from Umri**
> (Irrigation time has reduced by nearly 70–80%)

> We saved our yield this season thanks to Meero LINK app's timely weather forecast. We brought our harvested wheat indoors after checking the app—soon after, it rained so heavily that rivers overflowed. Our crop was saved.
>
> - **A group of women farmers shared during FGD**

Impact of precision tools- social and behavioral shifts

I feel more confident and vocal now. I spoke in Delhi, and it was nerve-wracking, but no one judged us. Back home, some said,
'How could you travel outside when even your husband hasn't?'
I encourage other women to use technology, not just for farming, but for the new opportunities it can open up.

- An ATR winner

Towards strengthened agency, confidence, and peer leadership

Women are increasingly engaging in farming dialogues, advising peers, and navigating digital tools, signaling shifts in gender norms around mobility and technology use.

Increased awareness, digital confidence, and trust in tools

1. Early skepticism, fueled by misinformation and unfamiliarity, gave way to confidence through hands-on experience and peer learning.
2. Use of shared household smartphones evolved from occasional access to purposeful engagement with the Meero LINK app.
3. Women began checking mandi prices, weather updates, and irrigation data, often with support from sons, devars, or community facilitators.
4. Group-based discussions and repeated exposure-built comfort and interest in exploring more tools, and visible benefits strengthened their trust.

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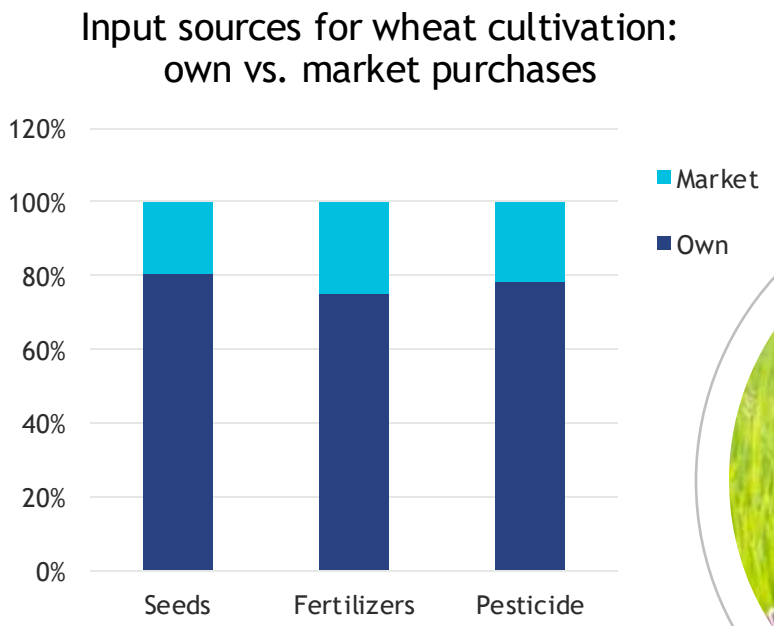
Positive impact in one crop-cycle, says the precision tool adopters*

The integration of technology with SIRDI's ongoing organic farming practices led to improvements in yield, time efficiency, income, crop quality, and a reduction in water usage and input costs.



01 **Income:** Women farmers reported up to 35–40% increase in income, attributed to better market timing and reduced input wastage.

02 **Yield/production:** Soil-health-driven and irrigation input planning contributed to up to a 10%–30% increase in wheat yield.

03 **Time saved:** 80% reduction in time spent on irrigation, from 4–5 hrs/day to under 2 hrs/day.

04 **Reduction in input costs:** Women farmers reported a 78% reduction in electricity use for irrigation, saving up to ₹1,300 per crop cycle.

05 **Improved crop quality:** Farmers observed healthier and shinier crop yields.

06 **Decreased wastage:** Timely weather alerts through the app helped prevent post-harvest losses, e.g., during unexpected rains.

* Please note that the productivity and yield were self-reported by a few women farmers who were early adopters of precision tools.

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Case study of Sakubai- smarter irrigation, better yields

Sakhubai, a smallholder farmer from Khapa village, faced acute water scarcity and relied on guesswork for irrigation, limiting her Kharif crop to maize.

Peer learning → Trust in technology

- Observed how over-irrigation on neighboring farms weakened wheat crops, degraded the soil and decreased yield.
- With this awareness, she grew more confident in the sensor's guidance and began to rely on its alerts consistently.

Towards active investors of precision tools

- Sensor-guided irrigation helped her significantly reduce water use.
- She expressed readiness to pay for the technology, recognizing it as an essential farming tool rather than a temporary support.
- This willingness reflects both her trust in the intervention and the potential for scaling adoption among other smallholder farmers.

She earned nearly **1.5×** more due to better yield and crop value.

She expanded to 2 acres of maize and 1 acre of wheat.

Improved irrigation led to heavier, shinier, and higher-quality produce.

"Last year, I could only plant maize in Kharif. With the moisture sensor, I now irrigate precisely and expand my crops"

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Case study of Lalita- from village fields to Delhi stage

A woman farmer, travelling for the first time from her village, Bivapur, Betul, to Delhi as an ATR winner, shares her journey from tradition to tech confidence.

- **Declining soil health due to prolonged chemical fertilizer use.**
- **Unregulated irrigation practices, and patches of yellow-colored soil**
- **Limited exposure to precision farming technology and digital tools**

Adopting precision tools

- **Soil Testing:** Routinely tests her soil at the women-run community lab.
- **Meero LINK App:** Checks weather and mandi rates regularly.
- **Moisture Sensor:** Not installed yet due to financial constraints, but she understands its value and plans to purchase it.
- Actively **shares her learning** with children and peers.

Impact and plans

- **Selected as a program winner,** travelled to Delhi, and spoke publicly for the first time.
- **Plans to install a moisture sensor using the award money.**
- Gained confidence and recognition in her community.
- **Advocates for other women to adopt technology.**

Profile of the ATR winner

Years in Farming: 22+ years (no land ownership)
Crops grown: Wheat
Yield: 14 Quintals from 80kg seed input
Phone Access: Shared household smartphone (son)
Digital engagement: Limited smartphone usage for WhatsApp, calls, and YouTube.

> "During training, I understood how the moisture sensor works and saw its benefits. I haven't installed it yet, but I plan to. Saving water and reducing effort matter, especially for women like us, who manage both farm and home."

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Three dominant personas of women farmers by digital and precision agriculture technology integration

Tech-adjacent farmers

Access to technology
Low

Mode of engagement
Low

Learning and support
Low

Level of adoption
Low

20% of program women were tech-adjacent farmers.

Guided explorers

Access to technology
Medium

Mode of engagement
High

Learning and support
High

Level of adoption
Medium

70% of program women were guided explorers.

Tech-integrated farmers

Access to technology
High

Mode of engagement
High

Learning and support
High

Level of adoption
High

10% of program women were tech-integrated farmers.

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Tech-adjacent farmers: Engaged, yet on the periphery

> “Karyakatha didi came and installed an app in my daughter’s smartphone. I did not see or use it after that. I have attended the sessions occasionally, what to do we have other work to do.”

Access to technology

- Do not own a smartphone at all in the household.
- Indirect access via male members or children
- No personal smartphone ownership

Mode of engagement

- Passive observers during training sessions an team building activities with irregular attendance.
- Information exposure through second-hand accounts during FIG meetings.

Learning and support

- Passive learning through observation and repeated information dissemination by karyakarthas and facilitators.
- Need incentives and extensive hand-holding support to engage with precision tools.

Level of precision tools adoption

- Indirect beneficiaries at pre-adoption stage.
- Unwilling investors due to lack of awareness of value.
- Low confidence in applying the learned knowledge and using the tools.

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Guided explorers: testing the waters through support

> "We are old people with limited usage of smartphone. So, we have installed Meero LINK app in our VC Sakhi's phone. We call her up before irrigation and she tells us whether to irrigate or not."

Access to technology

- Limited direct access and usage of smartphones.
- Rely on community facilitators for the operation of technology
- Limited technological ownership with community facilitators as nodal point.

Mode of engagement

- Actively seek help to understand and apply the knowledge, driven by increased awareness and interest.
- Operate tools with assisted help from community facilitators in communicating the technology signals and information.

Learning and support

- A regular attendee and active participation in capacity-building sessions.
- Learn through assisted interactions, therefore keep community facilitators like VC Sakhi as nodal point.

Level of precision tools adoption

- Transitional adopters requiring everyday contact with community facilitators.
- Preparing for independent usage through cautious experimentation, confidence from successful registration and positive outcomes.
- Plans for tool investments however is looking for financial help like subsidy and loans.

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Tech-integrated farmers: Confident and independent users

> “After installing the moisture senor, I have stopped my guesswork irrigation and with the saved water, I have grown two types of crop this season. The soil test also helped me know that zinc is less in my soil and have to put more manure.”

Access to technology

- Have direct access to smartphones with occasional help from family members.
- Independently operate the precision tools.
- Exhibit digital and precision tool fluency

Mode of engagement

- Engage directly with the precision tools- moisture sensor, Meero LINK app offerings, and soil lab.
- Interpret and act on the data independently with occasional help on solutions.

Learning and support

- A regular attendee and active participation in capacity-building sessions.
- Fully grasped the knowledge and operate the technologies independently with occasional support.

Level of precision tools adoption

- Active adopters of precision tools and potential investors of other tools.
- Knowledge holders and mentors for other peers within the FIG groups and the larger community.
- Integrate precision tools into farming routines and input planning.

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Recommendations to scale precision tools among women farmers

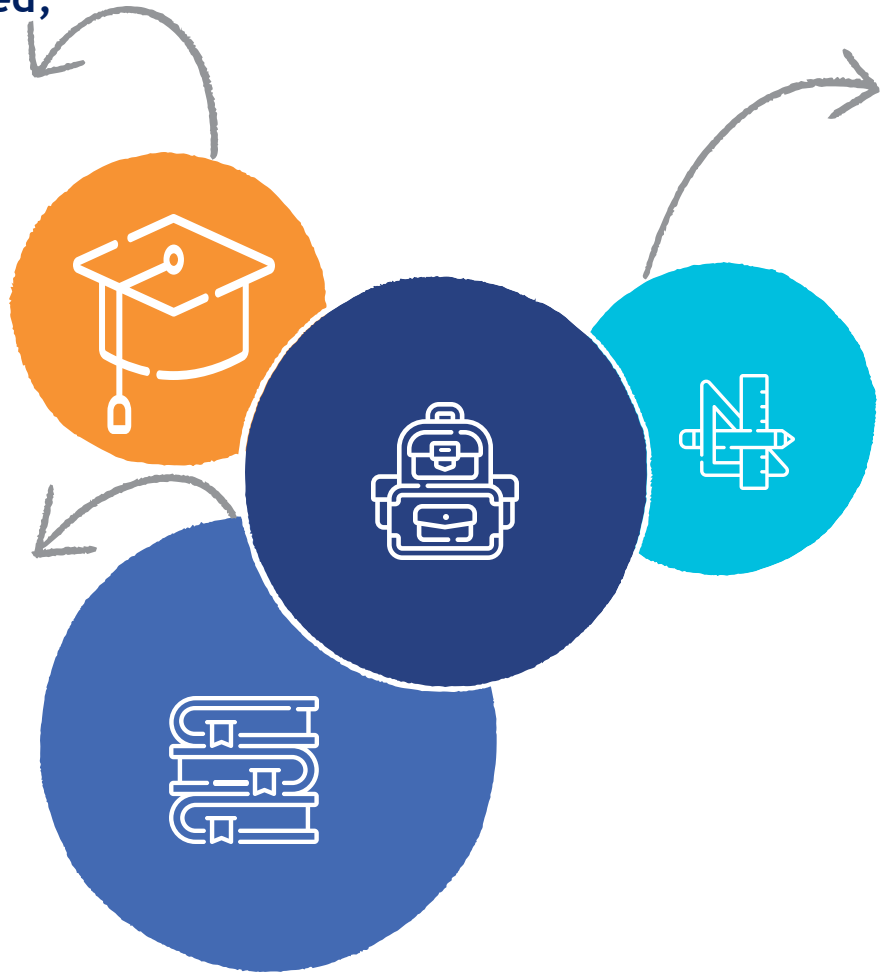
79% of women found technology helpful and are ready to invest, while 22% expressed interest but remained hesitant, underscoring the need for cost-sharing and continued support.

Gender-sensitive, community-based, and phygital delivery model

- Blend digital tools with trusted community networks to reach women where they are.
- Use FIGs, SHGs as spaces for tool access, demonstrations and peer support
- This ensures continuous learning and practical integration of technology

Expanded access to precision tools

- Develop simple, women-friendly financing and subsidy mechanisms for tool purchase.
- Introduce group-based ownership or risk-sharing models to build confidence and sustained investment in technology.



A tiered approach strategy by personas

- **Tech-Adjacent:** Continued handholding, exposure visits, and audio-visual demos.
- **Guided Explorers:** Tool usage milestones and mentorship from Tech-integrated peers.
- **Tech-Integrated:** Engage as trainers, data collectors, and agri-advisors in scale-up.

Moving women from tech-adjacent to tech-integrated through continuous exposure, mentorship, and confidence-building

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Next phase vision: scaling precision tools with organic practices

Building on the impact observed within a single crop cycle, SIRDI and Meero Labs will advance to the next phase by integrating precision technologies with organic farming, positioning women farmers at the forefront of sustainable and scalable agriculture.

Measuring productivity gains	Tracking income improvements	Assessing climate impact

Emergency alert system (field-level reporting)

- Women farmers will be able to report real-time field emergencies, such as fires, droughts, or pest attacks, directly through the Meero LINK app.
- Immediate alerts will reach PRPs, local authorities, and SHG leads for rapid response.

Carbon-credit enablement and tech- integration

- 1,000 soil tests to be conducted to build a baseline for carbon sequestration and nutrient usage efficiency.
- 100 moisture sensors to be installed
- Geo-tagging of organic input beds (e.g., CPP) will aid in traceability, remote monitoring, and certification readiness.

Drone deployment for organic spraying

- Introduce drones for targeted spraying of organic fertilizers, such as Taral Khad.
- Community-shared and accessible model for drone spraying, operated by trained personnel to ensure safe and targeted application.

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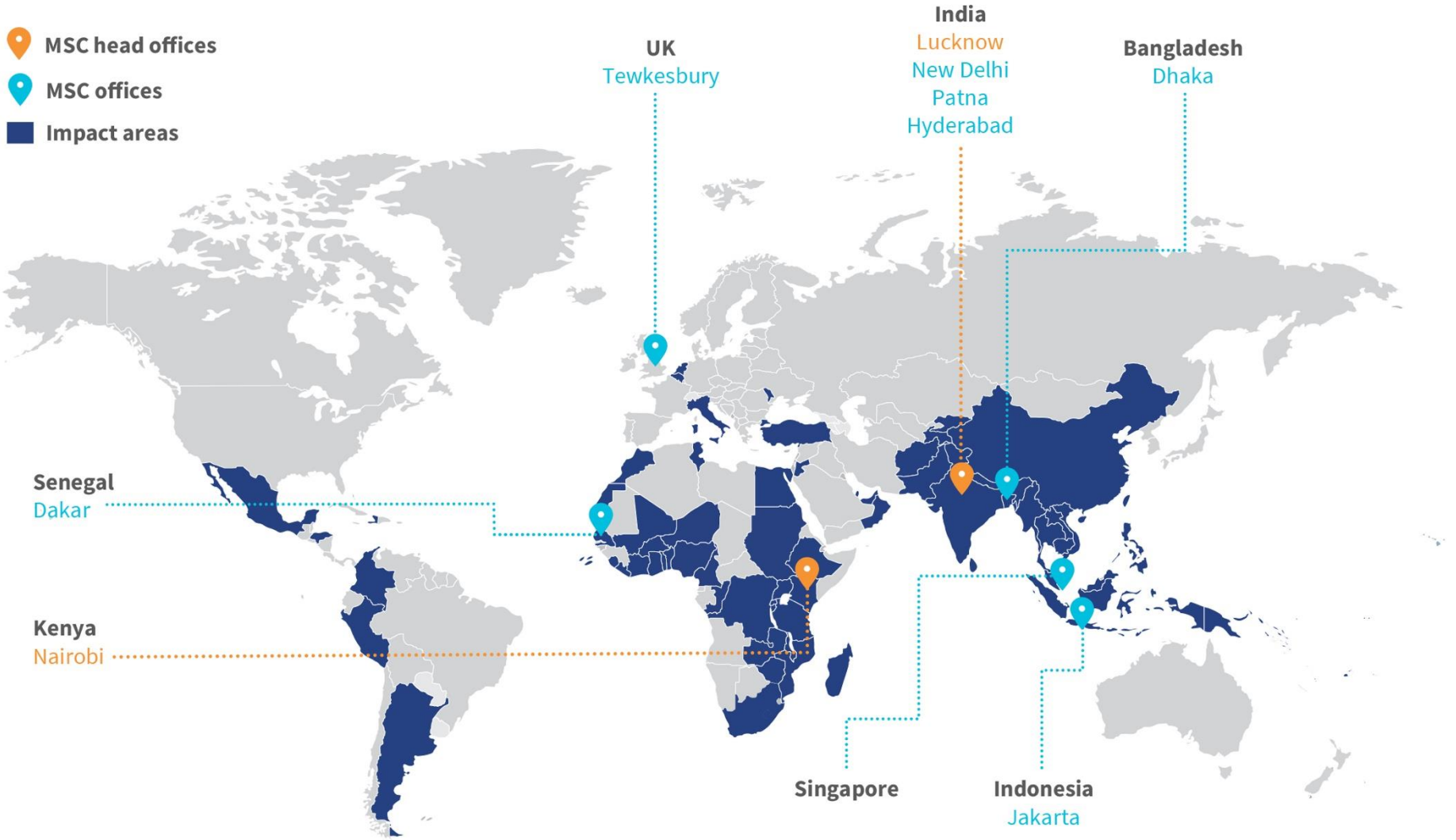

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